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Interim Report

ORSER-SSEL Technical Report 5-75

LINEAMENT MAP OF PENNSYLVANIA \*  
W. S. Kowalik and D. P. Gold

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ERTS Investigation 082  
Contract Number NAS 5-23133

INTERDISCIPLINARY APPLICATION AND INTERPRETATION OF ERTS DATA  
WITHIN THE SUSQUEHANNA RIVER BASIN

Resource Inventory, Land Use, and Pollution

Office for Remote Sensing of Earth Resources (ORSER)  
Space Science and Engineering Laboratory (SSEL)  
Room 219 Electrical Engineering West  
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Dr. George J. McMurtry  
Dr. Gary W. Petersen

Date: July 1975

\* Author identified significant result.

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# ABSTRACT

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## LINEAMENT MAP OF PENNSYLVANIA W. S. Kowalik

A lineament map of Pennsylvania was compiled from Landsat(ERTS)-1 infrared (channel 7, 0.8-1.1 $\mu$ ) transparencies at a scale of 1:989,000. Lines were drawn over features defining lineaments, with care taken to avoid generalization or extension. Lineaments were rated subjectively on two scales, one to provide the map user with a measure of the linearity and expression of the lineament and the other to indicate the dominant feature comprising the lineament. Cultural linears were filtered out and lines were not drawn along lithologic contacts.

A 7x10 inch map is supplied with this paper. A lineament map on a Pennsylvania base map at 1:1,000,000 will shortly be available.

## LINEAMENT MAP OF PENNSYLVANIA

W. S. Kowalik and D. P. Gold

Office for Remote Sensing of Earth Resources.  
Support for the work reported here was  
provided by NASA Contract NASA 5-23133 as  
part of the ERTS-1 Program.

"Lineaments" (linear fractures) were mapped on individual ERTS (Landsat)-1 channel seven positive transparencies in 9x9 inch format and compiled in a laydown mosaic at the same scale (approximately 1:1,989,000). The individual frames used and their positions in the mosaic are indicated in the top right hand corner of the map.

The lineaments were mapped on a light table (transmitted light) and interpreted on a subjective ordinal scale of quality, linearity, and expression from one to three, where class three lineaments are the straightest and best expressed. On the map, the number symbols are represented by a dotted line (class 1), dashed line (class 2), and solid line (class 3).

In addition, each lineament was categorized by the components of its composition as: (A) straight segments of major streams, i.e., water visible; (B) straight segments of minor streams, particularly alignments of these segments; and (C) alignment of tonal features, i.e., swampy patches, small streams, vegetation, wind gaps, etc. This classification is descriptive only; genetic relationships are incidental to the mapping scheme.

The overlays from each image mapped were checked against 1:250,000 topographic maps and "lineaments" clearly corresponding to cultural features such as roads, power lines, pipe lines, field boundaries, plough patterns, and trails were removed from the final compilation. Topographic features along which cultural features have been built were retained as lineaments. Lineaments along primary lithologic contacts were avoided; however, those representing secondary or imposed structures, such as the trace of dikes or faults, were included. It is believed that the lineaments remaining on the final map have structural significance.

A lineament map of the State will be completed using three operators in order to assign confidence limits to the reality of a particular lineament. In the future, lineament maps will be produced at the following scales: 1:1,000,000, 1:380,160 (based on the Pennsylvania Stream map), and 1:250,000 (based on the Pennsylvania Geological Map).

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# ERTS-1 LINEAMENT MAP OF PENNSYLVANIA

## Explanation

- Best expressed and most linear features visible —————
- Features of intermediate linear expression - - - - -
- Marginally linear features . . . . .
- Alignments of major stream or other water body segments (water visible) → \*
- Alignments of minor stream segments (water not visible) → \*
- Alignments of tonal features not fitting designations A or B → c

## Images Interpreted:

ID No.	Date	ID No.	Date
1. 1407-15350-7	3 Sep 73	8. 1080-15185-7	11 Oct 72
2. 1407-15352-7	3 Sep 73	9. 1080-15185-7	11 Oct 72
3. 1048-15225-7	7 Sep 72	10. 1078-15124-7	10 Oct 72
4. 1244-15312-7	24 Mar 73	11. 1078-15131-7	10 Oct 72
5. 1458-15221-7	25 Oct 73		
6. 1045-15240-7	6 Sep 72		
7. 1495-15222-7	30 Mar 73		

0 10 20 30 40 50 K.M.

Lineament Interpretation by: M. L. P. Smith  
Base map of Pa. by U.S.G.S. at 1:200,000

